

Chapter 15: Communication Systems

Presenter:

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What is Resilience?

- *“the ability to prepare for and adapt to changing conditions and to withstand and recover rapidly from disruptions. Resilience includes the ability to withstand and recover from deliberate attacks, accidents, or naturally occurring threats or incidents.”* (PPD 21)

"Critical Infrastructure" added to the
National Preparedness System
in PPD21



Communication Systems

- **Availability**

- Amount or percentage of time a communications system is accessible for use
- Best communications networks have 99.999 percent availability or “Five 9’s” availability

- **Reliability**

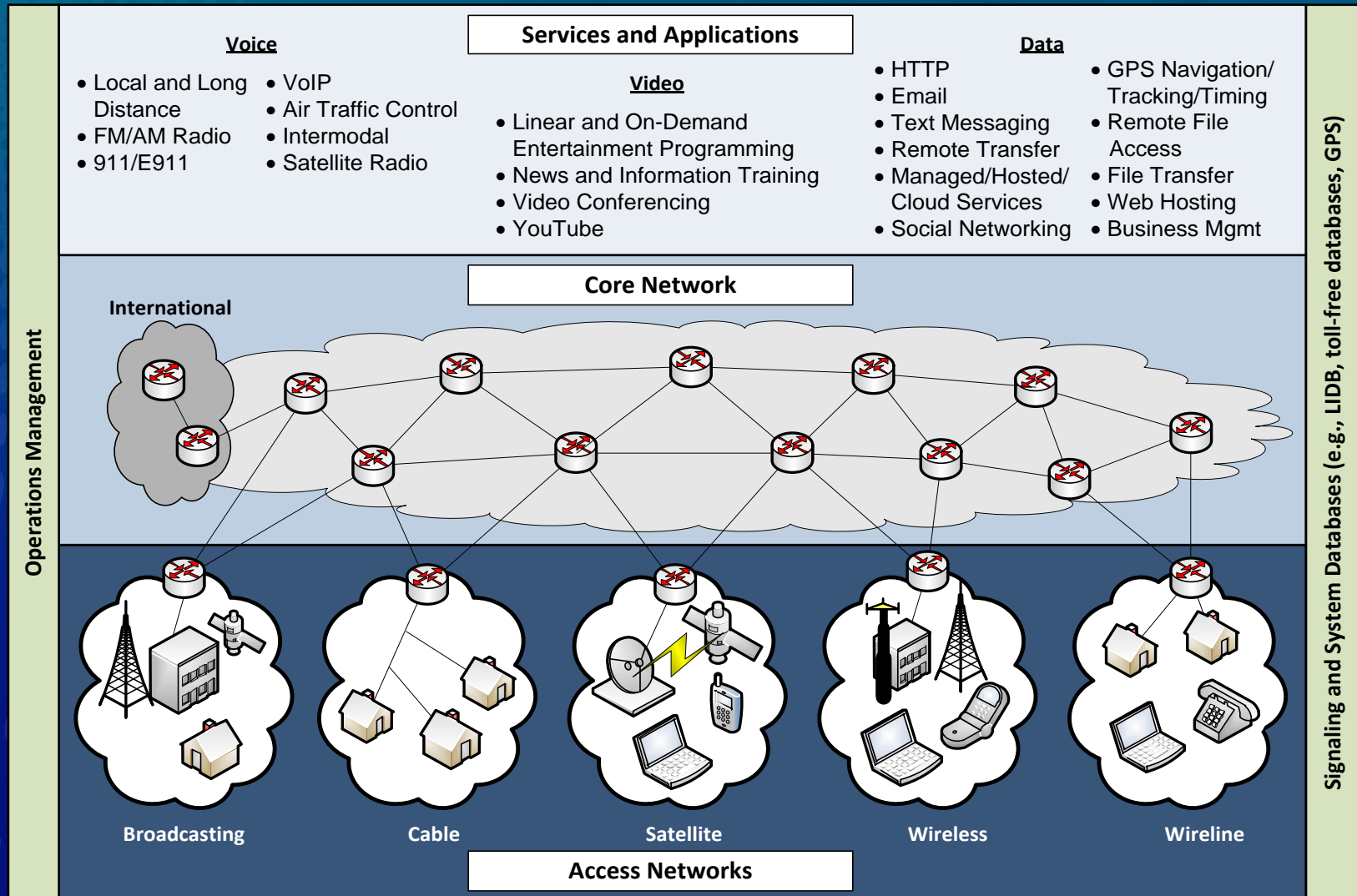
- Probability of successfully performing an intended function over a given time period which is measured as the frequency of downtime
- Reliability and availability are related, but not the same
- A communications network may have a high availability with multiple short downtimes or failures during a year

- **Resilience**

- Includes the ability of a system to prepare for anticipated hazards, adapt to changing conditions, and withstand and recover from disruptions.
- Recovery from a hazard event may include plans to rebuild infrastructure to improve performance



Communications Sector Architecture Model (source DHS)



Communication Networks

Core Network

- Core networks transport a high volume of aggregated traffic over substantial distances, typically via fiber or satellite and interconnect with access networks across the country or connecting continents using submarine fiber optic cable systems

Access Networks

- **Broadcasting**
 - Radio and television stations are licensed by the Federal Communications Commission (FCC) to provide service to local communities. Most markets are served by a number of radio and television stations
- **Cable**
 - The cable topology is composed of cable systems and headend facilities. In addition to analog and digital video programming services the cable industry provides digital telephone service and high-speed Internet access service



Communication Networks

Access Networks- continued

- **Satellite**

- Communications satellites can provide voice, video, and data services over large geographic areas from their vantage points above the Earth's surface

- **Wireless**

- The wireless topology is composed of cell sites, towers, switching offices, spectrum, wireless devices, and transport facilities

- **Wireline**

- Wireline service providers serve enterprise, small business, and residential users throughout the country by providing high-speed Internet access, telephone service, and video programming



Infrastructure

Communication Hubs

- Buildings that house critical infrastructure equipment
- Resiliency concerns
 - Performance of the structure
 - Interior placement and protection of critical equipment
 - Dependence on other services

Distribution networks

- Wireline, Cable, Satellite or Wireless
- Resiliency concerns
 - Performance of the structure
 - Power, backup power & fueling
 - Dependence on other services



Performance Goals Table

Communications Infrastructure	Support Needed ⁴	Design Hazard Performance								
		Phase 1 Short-Term			Phase 2 Intermediate			Phase 3 Long-Term		
		Days			Weeks			Months		
		0	1	1-3	1-4	4-8	8-12	4	4-24	24+
Core and Communications Buildings										
Communications Hub (e.g., Central Office, IXP, Data Centers, etc.)										
First/Last Mile										
Critical Facilities										
Hospitals										
Police and fire stations										
Emergency Operation Center										
Emergency Housing										
Residences										
Emergency responder housing										
Public Shelters										
Housing/Neighborhoods										
Essential city service facilities										
Schools										
Medical provider offices										
Retail										
Community Recovery Infrastructure										
Residences										
Neighborhood retail										
Offices and workplaces										
Non-emergency city services										
Businesses										



Dependencies

- Energy
 - Communication hubs, cell towers, HVAC systems, etc.
- Transportation
 - Roadways for recovery equipment, personnel & fuel
 - Trip permits, weigh station requirements, tolls, etc.
- Building/Facilities
 - Cell Sites located on buildings
- Water & Wastewater
 - HVAC and sanitary systems
- Public Safety Access & Credentialing
- Other Communication Providers



Regulation

- Federal:
 - Federal Communications Commission (FCC) is the government agency that regulates interstate and international communication.
- State:
 - State agencies have authority over many aspects of service. Most commonly the agency responsible at the State level is known as the Public Service Commission (PSC) however other state agencies have jurisdiction over communication (e.g.: State DOTs have jurisdiction over rights-of way)
- Local:
 - Local Government has jurisdiction over the communication infrastructure through a number of agencies (e.g.: Department of Buildings) which regulates placement of electrical equipment , standby power, and fuel storage. Local Governments also regulate zoning polices, rights-of-way and land use.



Items to Consider

- Leverage existing tools
 - Telecommunications Service Priority (TSP)
 - Government Emergency Telecommunications Service (GETS) & Wireless Priority Service (WPS)
 - Use intermodal approach (combination of services) & diversity (transport facilities)
- Implementation of Emergency Communication Systems
 - Wireless Emergency Alerting (WEA) and Emergency Alert Systems (EAS)
- Discussions with providers are essential
 - Prioritize community needs
 - Understand provider input on NIMBY and Right of Ways concerns
 - Resilient networks for critical services can be built to meet community objectives.



Questions?

